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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/549,817	09/19/2005	Richard Michael Jenkins	124-1134	3760

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NIXON & VANDERHYE, PC
901 NORTH GLEBE ROAD, 11TH FLOOR
ARLINGTON, VA 22203

EXAMINER	
BLEVINS, JERRY M	

ART UNIT	PAPER NUMBER
2883	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/549,817	JENKINS ET AL.	
	Examiner	Art Unit	
	Jerry Martin Blevins	2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 September 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,12-17,19,21-25,27 and 30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,12-17,19,21-25,27 and 30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 September 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1-6, 12-17, 19, 21-25, 27, and 30 have been considered but are moot in view of the new ground(s) of rejection.

Specifically, examiner admits that although US 6,219,470 to Tu teaches waveguides (312) formed in a substrate (301), and that light propagates between wavelength filters (303, 304, 305), Tu does not teach that the waveguide actually guides the light between the wavelength filters, at least not in the ordinary usage of the term "to guide". However, examiner contends that this limitation is an obvious variant, as extending the waveguide as to guide the light that already propagates between the filters would be beneficial for preventing stray scattering of light.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-6, 12-14, 17, 19, 22, 23, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tu in view of Miura.

Regarding claim 1, Tu teaches an optical wavelength division multiplexer/demultiplexer device (Fig. 3) comprising a substrate (301) having a plurality of wavelength selecting filters (303, 304, 305), the filters being arranged to provide conversion between a combined beam comprising a plurality of wavelength channels

and a plurality of separate beams each comprising a subset of the plurality of wavelength channels (column 3, line 45 – column 4, line 3). Tu also teaches waveguides (312) formed in the substrate and that light propagates between the wavelength filters (Figure 3). Tu does not teach that the waveguides "guide" light between the wavelength filters. It would have been obvious to one of ordinary skill in the at the time of the invention to extend the waveguides of Tu such that they guide the light that already propagates between the wavelength filters. The motivation would have been to reduce stray scattering of light. Tu also does not teach that the waveguides have hollow cores. Miura teaches hollow core waveguides formed in a substrate to guide light between wavelength filters of a multiplexer/demultiplexer device (pages 4785-4879). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the hollow core waveguides of Miura in the device of Tu. The motivation would have been increase temperature insensitivity (Miura, page 4785).

Regarding claim 2, Tu teaches that the plurality of wavelength selecting filters transmit a single wavelength channel (column 3, line 45 – column 4, line 3).

Regarding claim 3, Tu teaches that the wavelength selecting filters comprise thin film optical filters (column 3, line 45 – column 4).

Regarding claim 4, Tu teaches a plurality of alignment slots (302) arranged to receive, in alignment, the optical filters.

Regarding claim 5, Tu in view of Miura renders obvious the limitations of the base claim 4. Tu does not teach MEMS structures to provide the alignment. Miura teaches MEMS structures that provide alignment (pages 4875-4879). It would have

been obvious to one of ordinary skill in the art at the time of the invention to include the MEMS structures of Miura in the device of Tu. The motivation would have been to increase the functionality of the device (Miura, page 4875).

Regarding claim 6, Tu teaches that the substrate comprises silicon (column 3, line 45 – column 4, line 3).

Regarding claim 12, Tu in view of Miura renders obvious the limitations of the base claim 1. Tu does not teach that a base portion and a lid portion define the hollow core waveguide. Miura teaches a hollow core waveguide defined by a base portion and a lid portion (Fig. 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the lid and base of Miura in the device of Tu. The motivation would have been to improve the confinement of light within the waveguide.

Regarding claim 13, Tu in view of Miura renders obvious the limitations of the base claim 1. Tu also teaches a further waveguide (307) provided in the substrate and that the combined beam and/or the plurality of separate beams each comprising a subset of the plurality of wavelength channels propagate to/from the plurality of wavelength selecting filters. Tu does not teach that the further waveguide "guides" the combined and/r plurality of separate beams. It would have been obvious to one of ordinary skill in the at the time of the invention to extend the further waveguide of Tu such that it guides the combined and/or plurality of separate beams that already propagate between the wavelength filters. The motivation would have been to reduce stray scattering of light. Tu also does not teach that the waveguide has a hollow core. Miura teaches hollow core waveguides formed in a substrate to guide light between

wavelength filters of a multiplexer/demultiplexer device (pages 4785-4879). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the hollow core waveguide of Miura in the device of Tu. The motivation would have been increase temperature insensitivity (Miura, page 4785).

Regarding claim 14, Tu teaches a alignment slots (302) arranged to receive, in alignment, an optical fiber, thereby enabling light to be coupled between the optical fiber and the at least one further waveguide.

Regarding claim 17, Tu in view of Miura renders obvious the limitations of the base claim 1. Tu does not teach that the hollow core waveguide comprises a reflective element. Miura teaches a hollow core waveguide with a reflective element (Fig. 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the reflective material of Miura in the device of Tu. The motivation would have been to improve the confinement of light within the waveguide.

Regarding claim 19, Tu in view of Miura renders obvious the limitations of the base claim 1. Tu does not teach that the hollow core waveguides are dimensioned to support fundamental mode propagation. Miura teaches fundamental mode propagation in a hollow core waveguide (pages 4786, 4787). It would have been obvious to one of ordinary skill in the art at the time of the invention to dimension the waveguides of Tu such as to support fundamental mode propagation, as taught by Miura. The motivation would have been to increase the functionality of the multiplexing capabilities.

Regarding claim 22, Tu in view of Miura renders obvious the limitations of the base claim 1. Tu does not teach that the hollow core waveguides have a substantially rectangular cross section. Miura teaches hollow core waveguides with a substantially rectangular cross section (Fig. 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the substantially rectangular waveguide of Miura in the device of Tu. The motivation would have been to improve alignment with the substantially rectangular device of Tu (Fig. 3).

Regarding claim 23, Tu in view of Miura renders obvious the limitations of the base claim 1. Tu does not teach at least three wavelength channels. Miura teaches a wavelength division multiplexing device comprising at least three wavelength channels (page 4786). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the at least three wavelength channels of Miura in the device of Tu. The motivation would have been to increase the functionality of the multiplexing capabilities.

Regarding claim 30, Tu teaches a substrate (301) for an optical wavelength multiplexer/demultiplexer device (Fig. 3) comprising a plurality of alignment slots (302) for receiving a plurality of wavelength selecting filters (303, 304, 305) and waveguides (312) that provide light which propagates between the alignment slots wherein the arrangement provides, when appropriate wavelength selecting filters are located in the alignment slots, conversion between a combined beam comprising a plurality of wavelength channels and a plurality of beams comprising a single wavelength channel (column 3, line 45 – column 4, line 3). Tu does not teach that the waveguides "guide"

the light that already propagates between the alignment slots. It would have been obvious to one of ordinary skill in the at the time of the invention to extend the waveguides of Tu such that they guide the light that already propagates between the alignment slots. The motivation would have been to reduce stray scattering of light. Tu also does not teach that the waveguides have hollow cores. Miura teaches hollow core waveguides formed in a substrate to guide light between wavelength filters of a multiplexer/demultiplexer device (pages 4785-4879). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the hollow core waveguides of Miura in the device of Tu. The motivation would have been increase temperature insensitivity (Miura, page 4785).

Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tu in view of Miura as applied to claim 14 above, and further in view of US 6,101,210 to Bestwick et al.

Regarding claims 15 and 16, Tu in view of Miura renders obvious the limitations of the base claim 14. Tu does not teach a mode matcher. Bestwick teaches a ball lens mode matcher (column 2, lines 9-16). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the ball lens mode matcher of Bestwick in the device of Tu. The motivation would have been to improve coupling between the fiber and the waveguide (Bestwick, column 2, lines 9-16).

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tu in view of Miura as applied to claim 1 above, and further in view of US 2002/0191907 to Kinoshita et al.

Regarding claim 21, Tu in view of Miura renders obvious the limitations of the base claim 1. Tu does not teach that the hollow core waveguides are dimensioned to support multi-mode propagation. Miura teaches multimode propagation in the hollow core waveguides (page 4876). It would have been obvious to one of ordinary skill in the art at the time of the invention to dimension the waveguides of Tu so that they propagate multi-mode signals, as taught by Miura. The motivation would have been to increase the functionality of the multiplexing capabilities. Tu also does not teach that the wavelength selecting filters are spaced apart by the re-imaging distance. Kinoshita teaches wavelength selecting filters spaced apart by the re-imaging distance (paragraphs 66 and 67). It would have been obvious to one of ordinary skill in the art at the time of the invention to space the filters of Tu by the re-imaging distance, as taught by Kinoshita. The motivation would have been to enhance proper interference between wavelength modes (Kinoshita, abstract).

Claims 24, 25, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tu in view of Miura as applied to claim 1 above, and further in view of US 6,097,517 to Okayama.

Regarding claims 24, 25, and 27, Tu in view of Miura renders obvious the limitations of the base claim 1. Tu also teaches that the device is arranged to receive a combined beam comprising a plurality of wavelength channels and to separate the combined beam into a plurality of beams each comprising a subset of the plurality of wavelength channels, and that the device is arranged to receive a plurality of beams each comprising a subset of the plurality of wavelength channels and to combine the plurality of beams to produce a combined beam comprising a plurality of wavelength channels (column 3, line 45 – column 4, line 3). Tu does not teach that one of a plurality of beams produced by a demultiplexer stage are routed to a multiplexer stage via an optical processor. Okayama teaches beams routed to a multiplexer stage via a matrix switch processor, wherein the matrix switch receives an additional wavelength channel, and the matrix switch is arranged to route at least one additional wavelength channel to the multiplexer stage (column 4, line 58 – column 5, line 12 and column 8, lines 37-57). It would have been obvious to one of ordinary skill in the art at the time of the invention to rout the beams of Tu to a multiplexer stage via an optical processor, as taught by Okayama. The motivation would have been to reduce the size of the device (Okayama, column 4, line 58 – column 5, lie 12).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jerry Martin Blevins whose telephone number is 571-272-8581. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JMB

CHARLIE PENG
PATENT EXAMINER
AU 2883